

Abstracts of Contributed Talks

Graceful Labelings of Some Unicyclic Graphs

Jay Bagga, Ball State University

Suppose that G is a graph with q edges. A one-one function f from the set of vertices $V(G)$ to the set $\{0, 1, 3, \dots, q\}$ induces an edge labeling where each edge uv is assigned the label $|f(u) - f(v)|$. f is called a *graceful labeling* if the induced edge labels are distinct. Thus the edge labels must be $1, 2, \dots, q$. In 1966, Rosa showed that a cycle C_n has a graceful labeling if and only if $n \equiv 0 \pmod{4}$ or $n \equiv 3 \pmod{4}$. The famous *graceful tree conjecture* states that all trees have graceful labelings.

Truszczyński conjectured in 1984 that all unicyclic graphs, except cycles C_n with $n \equiv 1 \pmod{4}$ or $n \equiv 2 \pmod{4}$, are graceful. In this presentation we discuss graceful labelings of some classes of unicyclic graphs. We also investigate properties of such graceful labelings.

Graph Algorithms Software Systems

Jay Bagga and Adrian Heinz*, Ball State University

We have developed several software systems for learning and research. The system Manohar enumerates graceful labelings of paths, cycles and suns. It also computes graceful labelings of trees and some variations of graceful labelings. The system JGraph provides a number of well-known algorithms including planarity testing and drawing. Students and researchers can experiment with the software and even add new algorithms. We will demonstrate some new features of this system. Another application is Colossus, a system for drawing the visibility graph for any given polygon in real time and finding ears and mouths.

2-arc Transitive Polygonal Graphs of Large Girth and Valency

Eric Swartz, Ohio State University

Abstract: A near-polygonal graph is a graph Γ which has a set C of m -cycles for some positive integer m such that each 2-path of Γ is contained in exactly one cycle in C . If m is the girth of Γ then the graph is called polygonal. Up until now, the only examples of 2-arc transitive polygonal graphs with arbitrarily large valency had girth no larger than seven, and the 2-arc transitive polygonal graph with largest girth had valency five and girth twenty-three (in fact, even with no restrictions on the automorphism group, there were no examples of polygonal graphs with odd girth greater than twenty-three). We provide a construction of an infinite family of polygonal graphs of arbitrary girth m with 2-arc transitive automorphism groups, showing that there are 2-arc transitive polygonal graphs of arbitrarily large valency for each girth m .

New Results in Goldberg Conjecture

Oguz Kurt, Ohio State University

Let χ' and χ'^* be the chromatic index and fractional chromatic index of a graph, respectively. In the first half of the 1970's, Goldberg and Gupta separately conjectured that $\chi' = \lceil \chi'^* \rceil$ if $\chi' > \Delta + 1$. Two approaches proved to be useful in proving results regarding this conjecture: Edge-coloring a critical graph after deleting one of its edges and linear programming. Since Tashkinov proved that one can find an elementary and closed set in a critical graph with $\chi' > \Delta + 1$ through his tree argument, the first type of research on this conjecture started to become more and more active. In this talk, we will talk about the recent results since Tashkinov's paper. We will finish our talk with two new results improving the latest results of Scheide and Yu.
